

REMARKS

Claims 21-59 are pending in this application. Claims 30-59 are presently withdrawn from consideration. Claim 21 is amended without introduction of new matter. Applicants initially note that the prior Amendment filed October 25, 2007 has not been entered. See Advisory Action, December 6, 2007. Thus, the claims are presently in the form as amended by the Amendment filed September 15, 2006, and as amended by this Amendment filed concurrently with a Request for Continued Examination.

Claims 21-27 stand rejected under 35 U.S.C. 102(e) as being anticipated by Applicants' Figure 2 (Background Art). This rejection is respectfully traversed.

Claim 21 is directed to an electrode structure, comprising: "a first conductive layer; a dielectric layer over said first conductive layer, said dielectric having an opening exposing a portion of said first conductive layer; an adhesion layer over in said opening in said dielectric layer and over said exposed portion of said first conductive layer; a second conductive layer formed at least partially over said adhesion layer, wherein said second conductive layer and said adhesion layer are recessed within said opening in said dielectric layer; and a third conductive layer formed over and at least partially in direct physical contact with said second conductive layer and said adhesion layer within said opening, wherein said third conductive layer is recessed within said opening in said dielectric layer." The remaining rejected claims depend directly or indirectly from claim 21.

As noted in a pre-appeal brief submitted March 29, 2007 in this application, Applicants' invention addresses a problem within the prior art. As shown by Applicants' Figure 1B (below), a conventional electrode structure 100 has an arrangement of an adhesion/barrier layer 110 between first and second conductive layers 102, 112 which causes the upper electrode contact surface to consist of upper surfaces of layers 110, 112. Consequently, there is an undesirable variation in work function across the electrode contact surface. For instance, when used in conjunction with an array of programmable resistance memory devices, the work function differences in upper electrode contact surfaces of layers 110, 112 can cause a variation in the threshold switching voltage of each device. Applicants' disclosure, para. 5.

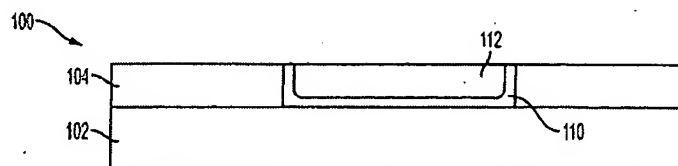


FIG. 1B

Applicants' claimed invention solves the multiple work function problem by providing, in part, "a third conductive layer formed over and at least partially in direct physical contact with said second conductive layer and said adhesion layer within said opening, wherein said third conductive layer is recessed within said opening in said dielectric layer". Non-limiting examples of the claimed invention are provided by Applicants' Figures 5 and 7, shown below. In both examples, the claimed elements correspond to the following illustrated components: first conductive layer (102); dielectric layer (104); adhesion layer (110); second conductive layer (112); and third conductive layer (114), which is over the upper surfaces of 110 and 112. Figure 7 further illustrates a top electrode 210 and memory element 200, provided on the third conductive layer (114). The additional (third) conductive layer 114 mitigates problems with having two different materials and associated work functions in contact with memory element 200.

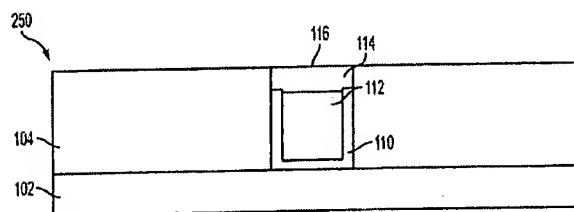


FIG. 5

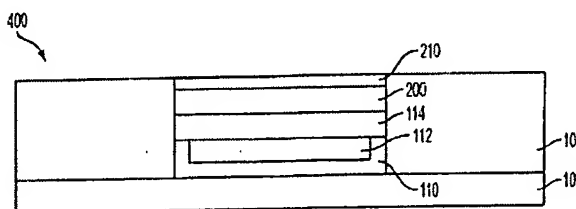


FIG. 7

The Office Action cites the following components of Applicant's Figure 2 (see reference characters in parentheses) as teaching the recited dielectric layer (104); first conductive layer (102); adhesion layer (110); second conductive layer (112); and third conductive layer (210). At the very least, Applicant's Figure 2 does not teach the conductive layer 210 as being formed "over and at least partially in direct physical contact with" the conductive layer 112 and adhesion layer 110. Applicants' Figure 2 therefore does not teach "a third conductive layer formed over and at least

partially in direct physical contact with said second conductive layer and said adhesion layer within said opening, wherein said third conductive layer is recessed within said opening in said dielectric layer” as claimed. Accordingly, Applicants respectfully requests that this rejection be withdrawn.

Claims 21-26 and 28 stand rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent No. 6,734,559 to Yang. This rejection is respectfully traversed.

The Office Action cites the following components of Yang’s Figures 3-5 (see reference characters in parentheses) as teaching the recited dielectric layer (226); first conductive layer (210); adhesion layer (221); second conductive layer (201); and third conductive layer (208). At the very least, Yang’s Figures 3-5 do not teach the conductive layer 208 as being formed “over and at least partially in direct physical contact with” the conductive layer 201 and adhesion layer 221. Yang’s Figures 3-5 therefore do not teach “a third conductive layer formed over and at least partially in direct physical contact with said second conductive layer and said adhesion layer within said opening, wherein said third conductive layer is recessed within said opening in said dielectric layer” as claimed. Accordingly, Applicants respectfully request that this rejection be withdrawn.

Claims 21-29 stand rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent No. 7,074,709 to Young. This rejection is respectfully traversed.

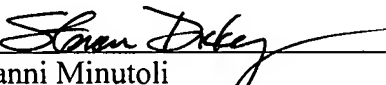
The Office Action cites the following components of Young’s Figures 3-6 (see reference characters in parentheses) as teaching the recited dielectric layer (35); first conductive layer (30); adhesion layer (36); second conductive layer (34); and third conductive layer (38). At the very least, Young’s Figures 3-6 do not teach the adhesion layer 36 and conductive layers 34, 38 as each being recessed within the same opening. Therefore, Young’s Figures 3-6 do not teach “wherein said second conductive layer and said adhesion layer are recessed within said opening in said dielectric layer; and a third conductive layer formed over and at least partially in direct physical contact with said second conductive layer and said adhesion layer within said opening, wherein said third conductive layer is recessed within said opening in said dielectric layer” as claimed. Accordingly, Applicants respectfully request that this rejection be withdrawn.

Claims 28 and 29 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Applicants' Admitted Prior Art in view of Young, (US Pat No. 7,074,709). As the proposed combination of AAPA and Young does not address (nor is cited as addressing) the above-noted deficiencies of AAPA, Yang, and Young, Applicants respectfully request that this rejection be withdrawn.

As all outstanding issues are addressed by this response to the outstanding Office Action, favorable reconsideration and allowance are solicited. If, however, there are remaining issues which can be addressed by a discussion with Applicant's representative, the Examiner is respectfully requested to contact the undersigned attorney, Steven Dickey, at (202) 420-4756. Further, if there are any additional charges in connection with this filing, the Examiner is respectfully requested and authorized to charge Deposit Account No. 04-1073 therefor.

Dated: December 26, 2007

Respectfully submitted,

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